



DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service

[Docket No. AMS-LPS-17-0046]

United States Standards for Grades of Pork Carcasses

AGENCY: Agricultural Marketing Service, USDA.

ACTION: Notice, request for comments.

SUMMARY: The U.S. Department of Agriculture's (USDA) Agricultural Marketing Service (AMS) is seeking public comment on revisions to the United States Standards for Grades of Pork Carcasses (pork standards). The last revision to the pork standards occurred in 1985 and the standards no longer accurately reflect value differences in today's pork products. Modern pork production is characterized by products with improved color and higher marbling content, two factors that have been consistently identified by researchers as the main components affecting pork eating quality.

DATES: Submit comments on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Interested persons are invited to submit comments electronically at <https://www.regulations.gov>. Written comments should be sent to: Pork Carcass Revisions, Standardization Branch, Quality Assessment Division; Livestock Poultry and Seed Program, AMS, USDA; 1400 Independence Ave., SW.; Room 3932-S, STOP 0258; Washington, DC 20250-0258. Comments may also be e-mailed to porkcarcassrevisions@ams.usda.gov. All comments should reference docket number AMS-LPS-17-0046, the date of submission, and the page number of this issue of the Federal Register. All comments received will be posted without change, including any

personal information provided, and will be made available for public inspection at the above physical address during regular business hours.

FOR FURTHER INFORMATION CONTACT: Bucky Gwartney, International Marketing Specialist, Standardization Branch, QAD, LPS, AMS, USDA; 1400 Independence Avenue, SW.; Room 3932-S, STOP 0258; Washington, DC 20250-0258; phone (202) 720-1424; or via e-mail at Bucky.Gwartney@ams.usda.gov.

SUPPLEMENTARY INFORMATION:

Section 203(c) of the Agricultural Marketing Act of 1946, as amended, directs and authorizes the Secretary of Agriculture “to develop and improve standards of quality, condition, quantity, grade, and packaging and recommend and demonstrate such standards in order to encourage uniformity and consistency in commercial practices” (7 U.S.C. 1622(c)). AMS is committed to carrying out this authority in a manner that facilitates the marketing of agricultural commodities. While the pork standards do not appear in the Code of Federal Regulations, they—along with other official standards—are maintained by USDA at <https://www.ams.usda.gov/grades-standards>. Copies of official standards are also available upon request. To propose changes to the pork standards, AMS utilizes the procedures it published in the August 13, 1997, Federal Register (62 FR 43439), which in 7 CFR part 36.

Background

Official USDA grade standards and associated voluntary, fee-for-service grading programs are authorized under the Agricultural Marketing Act of 1946, as amended (7 U.S.C. 1621 et seq.). The primary purpose of USDA grade standards, including the pork standards, is to divide the population of a commodity into uniform groups (of

similar quality, yield, value, etc.) to facilitate marketing. In concert, the Federal voluntary, fee-for-service grading programs are designed to provide an independent, objective determination as to whether a given product is in conformance with the applicable USDA grade standard. USDA quality grades provide a simple, effective means of describing product that is easily understood by both buyers and sellers. No voluntary USDA grading program currently exists for pork carcasses or parts.

USDA recognizes that the pork standards must be relevant to be of value to stakeholders and, therefore, recommendations for changes in the standards may be initiated by USDA or by interested parties at any time to achieve that goal. The pork standards were first developed in the early 1930s, with revisions over the years to reflect improvements made in the industry and changes in the marketplace. The current pork standards were last updated in 1985 and are based on a combination of muscle and fat thickness (including belly) that is then formulated into an expected percent yield. In the late 1980s and early 1990s, the pork industry reacted to growing consumer demand for increased leanness of pork cuts, investing in changes to meet this demand primarily by means of improved genetics and swine diet formulations. By the early 2000s, the pork industry had become so proficient at producing consistently lean pork that additional leanness in pork would begin to degrade other consumer desires related to pork quality.

In contrast to decades past, modern consumers have shifted away from prioritizing leanness as the primary attribute in selecting pork for purchase. Instead, today's consumers seek high quality marbling (fat streaking within the cut of meat) for superior taste. In addition, consumers are increasingly demanding consistency in pork products in terms of other quality attributes, in particular in color of the lean.

Pork Quality Initiative

Standards for grades enable buyers to obtain product that meets their individual needs, such as a restaurant choosing the highest quality pork to provide its customers a very consistent level of palatability. At the same time, standards for grades are important in transmitting information to producers to help ensure informed decisions are made. For example, the market preference and price paid for a particular grade of pork could be communicated to producers so they can adjust their production accordingly. In such a case, if the price premium being paid for a high grade of pork merits producers making the investments required in genetics and feeding to produce more of that grade, such marketing decisions can be made with justification.

The underlying interest in a potential pork quality grading system is not new to the industry. Many studies have measured pork populations and measured their innate quality characteristics. A study by Cannon et.al, 1996¹, showed that up to 10 percent of the carcasses evaluated in a nationwide audit had pale, soft, and exudative (PSE) characteristics, resulting in significant potential losses for the pork chain. In the 2002-2003 Benchmarking Value in the Pork Supply Chain project, Meisinger, 2003², noted, “Industry must develop clear economic signals for easily and objectively measuring ‘quality’ along the production chain to facilitate coordinated focus on generating pork to meet domestic and global, seasonal and geographical, consumer demands for fresh, enhanced, processed, consumer-friendly, value-added, and ready-to-eat products.” In

¹ Cannon, J.E., J.B. Morgan, F.K. McKeith, G.C. Smith, S. Sonka, J. Heavner and D.L. Meeker. 1996. Pork chain quality audit survey: Quantification of pork quality characteristics. *J. Muscle Foods* 7, 29-44.

² Meisinger, D.J. 2003. The national pork quality benchmarking study. Proceedings abstracts of the 56th American Meat Science Association Reciprocal Meat Conference. Columbia, MO.

1998, the National Pork Producers Council³ published color and marbling guidelines for pork products. According to these guidelines, a quality pork product with good eating quality should be in the color range of 3 to 5 (the entire range is 1-6) and have a marbling range of 2 to 4 (the entire range is 1-10). Recently, the National Pork Board updated those goals and stated that by 2020, the percentage of pork loin chops scoring below a color score of 3 would be reduced by 10 percentage points (from 55 to 45 percent), as compared with the 2012 retail study. The pork industry and the academic community have long used several parameters to measure quality characteristics, including color and marbling scores, pH, tenderness, and drip loss, with the intent of ultimately improving these characteristics over time. More recent attention has focused on the use of color and marbling, in combination, to segregate pork into like quality groupings that would deliver a more consistent, palatable product.

Evolution of the Pork Standards

Tentative standards for grades of pork carcasses and fresh pork cuts were issued by USDA in 1931 and slightly revised in 1933. New standards for grades of barrow and gilt carcasses were proposed by USDA in 1949. These standards represented the first application of objective measurements as guides to grades for pork carcasses. Slight revisions were made in the proposed standards prior to their adoption as the Official United Standards for Grades of Barrow and Gilt Carcasses, effective September 12, 1952.

The official standards were amended in July 1955, by changing the grade designations Choice No. 1, Choice No. 2, and Choice No. 3, to U.S. No. 1, U.S. No. 2, and U.S. No. 3, respectively. In addition, the backfat specifications were reworded

³ National Pork Producers Council Pork Quality Solutions Team. 1998. Pork Quality Targets. In Pork Facts. #04366 – 10/98. NPPC. Des Moines, IA.

slightly to reflect the reduced fat thickness requirements and to allow more uniform interpretation of the standards.

On April 1, 1968, the official standards were again revised to reflect the improvements made since 1955 in pork carcasses. The minimum backfat thickness requirement for the U.S. No. 1 grade was eliminated and a new U.S. No. 1 grade was established to properly identify the superior pork carcasses then being produced. The former No. 1, No. 2, and No. 3 grades were renamed No. 2, No. 3, and No. 4, respectively. The former Medium and Cull grades were combined and renamed U.S. Utility. Also, the maximum allowable adjustment for variations-from-normal fat distribution and muscling was changed from one-half to one full grade to more adequately reflect the effect of these factors on yields of cuts.

In addition, the text of the “Application of Standards” section was reworded to more clearly define the grade factors and clarify their use in determining the grade. On January 14, 1985, the barrow and gilt carcass grade standards were once again updated to reflect improvements in pork carcasses and changes in the pork slaughter industry since 1968⁴. A 1980 grade survey found that over 70 percent of the pork carcasses being produced were in the U.S. No. 1 grade, indicating a large amount of variation in yield that was not being accounted for by the grades. The changes simplified the standards by basing the grade on the backfat thickness over the last rib with a single adjustment for muscling. In addition, the grade lines were tightened to more adequately sort the pork carcasses being produced among several grades. Some minor changes in the wording of the quality requirements were also made.

⁴ USDA, 1985. Official United States standards for grades of pork carcasses. Agricultural Marketing Service, United States Dept. Agric., Washington, DC.

Between 1985 and today, the pork industry and the pork carcasses and products that it produces have undergone significant change. The pork industry reacted to the consumer demand for leaner pork by making changes in genetics and nutrition. Unfortunately, during that period when production strategies focused on producing leaner pork, marbling and color became less important. However, research indicates that today's consumers are interested in a more consistent pork product with a greater focus on marbling and the color of the products. The pork industry is working to meet this demand, again by making changes within the genetic and nutrition systems.

The use of the current USDA pork grade standards in an official capacity has been non-existent since the mid-1970s, and the ability to differentiate pork into quality groupings and values has been a critical missing link. In the absence of a meaningful USDA pork grade standard, pork packers and processors have taken the initiative to sort the darker colored, higher-marbling pork for many export markets where demand is extremely high and associated price premiums exist. They also have developed branded programs with selection criteria that use both color and marbling to identify premium pork products. These programs generally seek higher color scores (4-5) and marbling scores (3-5).

Today's Quality Attributes

The U.S. is the second largest pork producing country in the world. Its production exceeds domestic consumption and, therefore, products need to be exported. Exports have continued to increase, with many markets demanding high quality pork that has certain color and marbling characteristics. These quality characteristics have been routinely used in processing plants to sort the higher quality pork for both export and for

foodservice establishments that are demanding these traits. A revision to the grade standards is needed that reflects a new population of pork products that have better color and a higher marbling content, and is able to differentiate products into quality categories that can fill the demand in many different market segments. These two factors have been consistently identified by numerous researchers as the components affecting pork eating quality, as verified through checkoff-funded research.

In one consumer study (Pork Quality Insights, 2014⁵) that looked at purchase criteria for fresh pork, the data showed that “quality and freshness” and color were key factors in fresh pork purchases. In general, consumers related a darker color to a higher quality product. Another study (Lusk et. al., 2016⁶) looked at how consumers value pork chop quality information. It found that the majority of the consumers used chop color to assess quality and said that color is more important than marbling. However, 30 to 40 percent of consumers misperceived lighter, lower quality pork products to be of higher quality than they actually were. Furthermore, when consumers evaluated pork chop products based on quality levels, the products bearing quality grades using Prime, Choice, and Select tended to generate higher sales and, therefore, more revenue for the chop producers. However, when presented with lighter-colored, lower quality pork chop products, 20 to 30 percent of consumers still preferred these products based on their lighter color, even when these products conspicuously bore a USDA quality label indicating that they were lower quality. Therefore, color may be more influential than a

⁵ Pork Insights. 2014. Prepared for the National Pork Board.

⁶ Lusk, J., G. Tonsor, T. Schroeder and D. Hayes. 2016. Consumer Valuation of Pork Chop Quality Information. Prepared for the National Pork Board. This study also found that taste was the most important attribute for consumers when purchasing chops.

grade level in some consumer decision making, which indicates that there are key opportunities within a revised pork quality standard to highlight the importance of color.

Recent research by Newman et. al., 2015⁷, as part of a National Retail Benchmarking audit, indicated that the quality of loin chops at retail was inconsistent and needed improvement. The range in color score for the retail chops was 1 to 6 with an average of slightly above 3. In addition, marbling scores also ranged from 1 to 6 with 2.5 as an average. An analysis of the data after they were sorted into various color and marbling combinations resulted in the following break points: HIGH - Color 4-5, Marbling ≥ 4 ; MEDIUM - Color 3, Marbling ≥ 3 ; LOW - Color 2, Marbling ≥ 2 . These would result in the following percentages of the retail population: 2.1, 45.1, and 22, respectively. The pork population studied by Moeller, 2008⁸, also showed a range and average for color and marbling scores similar to that found in the retail benchmarking study. There is evidence that the color and marbling score averages and the percentages in the total population would be higher without the exclusion of products being sorted for quality branded programs and sold at foodservice establishments or being exported from this data set.

A study by Tonsor et al., 2013⁹, looked at the important criteria needed for a viable, trusted pork quality grading system. The research indicates that a quality grading system would need to focus on product attributes that can be measured accurately and

⁷ Newman, D. 2015. National pork retail benchmarking study. National Pork Board Research abstract: #11-163.

⁸ Moeller, S.J., R. Miller and H. Zerby. 2008. Effects of pork quality and cooked temperature on consumer and trained sensory perception of eating quality in no-enhanced and enhanced pork loins. National Pork Board Research abstract: #06-139 and #07-005.

⁹ Tonsor, G.T., and T.C. Schroeder. 2013. "Economic Needs Assessment: Pork Quality Grading System." Available at: <http://www.agmanager.info/ag-policy/livestock-policy/economicneeds-assessment-pork-quality-grading-system>.

objectively at the speed of commerce (e.g., plant line speeds), facilitate product sorting by grade, relate directly to those product characteristics valued by buyers and consumers, and be trusted by potential users. In addition, a well-functioning pork quality grade system would provide important economic signals to the industry and encourage the production of higher quality pork products. These improvements would also lead to increased demand for pork, both domestically and internationally.

A working example of these criteria is the USDA beef quality grading system. The beef quality grade standards are widely adopted by the beef industry and are globally recognized. The USDA Prime and Choice beef grades are widely recognized by consumers, both domestically and abroad, as premium products that demand a higher value and also deliver a consistent eating experience. These grade groupings also result in an economic signal that is sent up and down the beef products chain, affecting the way producers implement genetic and nutritional changes. In addition, the adoption of instrument grading technologies has allowed the industry and USDA graders to stay in tune with plant line speeds and demands for consistent grade application.

The accurate measurement of color and marbling scores is important for a pork quality grading system. Published color and marbling scorecards and visual aids have been a primary subjective method for putting pork quality into categories, whether for research trials or at processing plants. Color evaluation has been performed using one of many objective color analyses. There has also been recent research on the ability to objectively measure pork quality through instrumentation. In a large modern pork processing facility, some form of instrumentation would be needed for pork quality evaluation at current line speeds.

The National Pork Board has indicated it is in the process of revising the current pork color and marbling score cards¹⁰. These cards will most likely contain additional information regarding the color parameters for each color range and would still be based on a 10th rib cross-section of the longissimus dorsi. The challenge with having this measurement location is that most processing facilities do not make that cross-section cut, and therefore it cannot be measured. Hogg, et al., 2006¹¹, evaluated the influence of chop location on subsequent color and marbling scores. They found that color and marbling were consistent with the central portions of the loin. There was more variability in the anterior and posterior portions, with anterior chops being generally darker, posterior chops generally lighter, and both ends having more marbling than centrally located chops. These results indicated that the location being measured for color and marbling is important and could be problematic when a 10th rib cross-section is not available. Current research being done with various instrumental measurements is showing promise in measuring lean color and marbling along the ventral portion of the loin where the back ribs have been removed, which could become a reliable indicator for color and marbling levels.

Proposed Changes to the Pork Standards

Printed below beginning with section 54.131 is the proposed text for a revised pork standard. While the preamble describing the history of the standards is not reprinted here, the body of the actual proposed standard (sections 54.131 through 54.135) is shown in its entirety. Should any updates to the pork standard occur, the preamble will be

¹⁰ National Pork Producers Council (NPPC). 1999. Official color and marbling standards. NPPC, Des Moines, IA.

¹¹ Hogg, J.W., A.T. Waylan, J.A. Unruh, and R.C. Johnson. 2006. Influence of chop location within a loin on boneless pork longissimus quality. J. Muscle Foods 17, 221-236.

updated accordingly. The current standard, including the preamble, can be viewed at https://www.ams.usda.gov/sites/default/files/media/Pork_Standard%5B1%5D.pdf.

As discussed, the proposed revised standard identifies marbling and color as the primary considerations for quality designations, instead of lean/fat and yield as exists in the current standard. Further, the proposed revised standard excludes the provision for grading of sow carcasses, maintaining the official standards for barrows and gilts only.

§ 54.131 Scope.

The standards for grades of pork are written primarily in terms of carcasses. However, they also are applicable to the grading of sides and primal cuts, such as the ham, loin, or shoulder. To simplify the phrasing of the standards, the words “carcass” and “carcasses” are used also to mean “side” or “sides.”

§ 54.132 Bases for pork carcass standards.

The official standards for pork carcass grades provide for segregation according to (a) class, as determined by the apparent sex condition of the animal at the time of slaughter, and (b) grade, which reflects the quality of lean in the carcass. A quality grade applied to a carcass will be associated with all cuts for that carcass, as long as the associated cuts are traceable through fabrication and labeling.

§ 54.133 Pork carcass classes.

The five classes of pork carcasses, comparable to the same five classes of slaughter hogs, are: barrow, gilt, sow, stag, and boar. The official pork quality standards provide for the grading of barrow and gilt carcasses; grades are not provided for sow, stag, or boar carcasses.

(a) Barrow. A barrow is a male swine castrated when young and before development of the secondary physical characteristics of a boar.

(b) Gilt. A gilt is a young female swine that has not produced young and has not reached an advanced stage of pregnancy.

(c) Sow. A sow is a mature female swine that usually shows evidence of having reproduced or having reached an advanced stage of pregnancy.

(d) Boar. A boar is an uncastrated male swine.

(e) Stag. A stag is a male swine castrated after development or beginning of development of the secondary physical characteristics of a boar. Typical stags are somewhat coarse and lack balance—the head and shoulders are more fully developed than the hindquarter parts, bones and joints are large, the skin is thick and rough, and the hair is coarse.

§ 54.134 Application of standards for grades of barrow and gilt carcasses.

(a) Grades for barrow and gilt carcasses are based on two general quality characteristics (1) the color of the exposed lean and (2) the amount of marbling associated with the lean.

(b) There are three general levels of quality recognized: (1) Prime, Choice, and Select. The quality (color and marbling) of the lean is best evaluated by a direct observation of its characteristics in the cut surface of the longissimus dorsi. Quality of the lean is described in terms of characteristics of the longissimus dorsi, at either the 10th rib cross-section or other cross-sections within the loin that expose a surface of the longissimus dorsi for evaluation, or the exposed lean on the ventral side of the boneless

loin after removal of the back ribs. The surface area of the longissimus dorsi should be at least 4 square inches to be acceptable for evaluating color and marbling characteristics.

(c) USDA uses photographs and other objective aids or devices designated by the Agricultural Marketing Service (AMS) in the correct interpretation and application of the standards.¹² Official pork color and marbling standards are maintained by the National Pork Board and will be used as official references for the USDA pork quality grades. Objective aids can also include predictive instrumentation technologies that evaluate color and/or marbling scores and meet thresholds for accuracy and precision of the predictions.

(d) To determine the grade of a carcass, the longissimus dorsi must be present at a minimum of 4 square inches and exposed for subjective and/or objective evaluation to allow a visual or instrumental assessment of color and marbling levels. This exposure can be done multiple ways:

(1) Exposing a cross-section of the longissimus dorsi at the 10th rib, or other location between approximately the 4th rib, posterior to the scapula (blade bone), and the longissimus dorsi cross-section anterior to the ilium (hip bone), or

(2) Exposing the longissimus dorsi on the ventral side of the boneless loin after removal of the back ribs.

Carcasses not presented in one of these manners are not eligible for quality grading.

For barrow and gilt carcasses, the cut surface of the longissimus dorsi shall be, at a minimum, slightly firm to be assessed for color and marbling levels. Lean firmness is essential for both the eating experience and in the fabrication process. Barrow and gilt

¹² Information concerning such devices and their use may be obtained from AMS' Livestock, Poultry, and Seed Program."

carcasses meeting the minimum lean firmness are eligible to be graded on color and marbling levels. Barrow and gilt carcasses having less than slightly firm lean are not eligible for pork quality grading.

For barrow and gilt carcasses, quality of the lean is evaluated by considering its color and marbling in a cut longissimus dorsi surface. Barrow and gilt carcasses will be assessed for their color and marbling levels based on the published standards by the National Pork Board. The color levels are evaluated on a scale from one to six and the marbling levels are evaluated on a scale of one to ten.

The firmness requirement of slightly firm is the same for all grades and a minimum requirement for application of a grade, regardless of the extent to which marbling may exceed the minimum of a grade.

§ 54.135 Specifications for official United States standards for grades of barrow and gilt carcasses.

(a) The quality grade of a barrow or gilt carcass is determined on the basis of the following: lean color score and lean marbling score.

The relationship between color, marbling, and quality grade is shown in Table 1.

TABLE 1 -- Pork Carcass Quality Grade Based on Lean Color and Marbling¹³

Quality Grade	Lean Color Score	Lean Marbling Score
USDA Prime	4-5	<u>Greater than or equal to 4</u>
USDA Choice	3	<u>Greater than or equal to 2</u>
USDA Select	2	<u>Greater than or equal to 2</u>

¹³ Carcasses with less than slightly firm lean are not eligible for quality grading.

(b) The following descriptions provide a guide to the characteristics of barrow and gilt carcasses in each grade.

(1) USDA Prime—Barrow and gilt carcasses in this grade have at least a slightly firm lean, a color score of 4 or 5, and a marbling score of 4 or greater.

(2) USDA Choice—Barrow and gilt carcasses in this grade have at least a slightly firm lean, a color score of 3, and a marbling score of 2 or greater.

(3) USDA Select—Barrow and gilt carcasses in this grade have at least a slightly firm lean, a color score of 2, and a marbling score of 2 or greater.

Request for Comments

AMS is soliciting comments from stakeholders about potential changes to the U.S. Standards for Grades of Pork Carcasses. This could also include any current and/or on-going research or industry practice that has relevance to this standard. AMS also invites comments about how those changes would be implemented in a voluntary pork grading system.

Dated: October 18, 2017

Bruce Summers
Acting Administrator
Agricultural Marketing Service

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